

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated October 18, 2006

REMARKS

I. Introduction

By the present Amendment, claims 1, 2, 5, 6, 9, 14, and 15 have been amended, and claim 4 canceled. Accordingly, claims 1-3 and 5-15 remain pending in the application. Claims 1, 6, and 15 are independent.

II. Interview

Applicants would like to thank Examiners Chow and Chauhan for the cooperation and courtesy extended during the interview of February 12, 2007. During the interview, the pending rejections, claims, and cited art were discussed. Applicants provided clarification for various terms and phrases recited in the claims, as well as a number of proposals for amending the claims in order to address the rejections raised under 35 USC §101 and §112. It was agreed that the proposals were sufficient to resolve the rejections under 35 USC §101 and §112.

Applicants also discussed proposed amendments to independent claim 1 intended to overcome the rejections predicated on 35 USC §103(a). In particular, Applicants indicated that the claimed invention provides a method wherein the smoothing process is performed prior to changing the irregular quadrilaterals into right-angled quadrilaterals. Applicants also indicated that this feature was illustrated in Fig. 6. No agreement was reached on whether the proposed amendments were sufficient to define over the art of record.

III. Office Action Summary

In the Office Action of October 18, 2006, the Drawings were objected to because of an informality. Claims 1-15 were rejected under 35 USC §101 as being

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated October 18, 2006

directed to non-statutory subject matter. Claim 9 was rejected under 35 USC §112, first paragraph, for failing to comply with the written description requirement. Claims 5, 9, and 15 were rejected under 35 USC §112, second paragraph, as being indefinite. Claims 1-3, 6, and 15 were rejected under 35 USC §103(a) as being unpatentable over the Background of the Invention in view of JP 06-067605 to Yura and U.S. Patent No. 5,333,248 issued to Christensen. Claim 7 was rejected under 35 USC §103(a) as being unpatentable over the Background of the Invention in view of Yura and Christensen, and further in view of U.S. Patent No. 5,249,263 issued to Yanker. Claim 8 was rejected under 35 USC §103(a) as being unpatentable over the Background of the Invention in view of Yura, Christensen, Yanker, and still further in view of U.S. Patent No. 5,961,573 issued to Hale. Claim 9 was rejected under 35 USC §103(a) as being unpatentable over the Background of the Invention in view of Yura, Christensen, Yanker, Hale, and still further in view of U.S. Patent No. 5,884,217 issued to Koyanagi. Claims 11-13 were rejected under 35 USC §103(a) as being unpatentable over the Background of the Invention in view of Yura and Christensen, and further in view either JP 11-282,344 to Arakawa et al. ("Arakawa"), JP 2001-140257 to Kobayashi et al. ("Kobayashi"), or the Surfer Software designed to produce contour or surface maps. These rejections are respectfully traversed.

IV. Drawings

The Drawings were objected to because of an informality. Regarding this objection, the Office Action indicates that Fig. 14A should be designated with a legend such as --Prior Art—. Concurrently submitted herewith is a Replacement Sheet which properly labels Fig. 14A as Prior Art. Withdrawal of this objection is therefore respectfully requested.

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated October 18, 2006

V. Rejections under 35 USC §101

Claims 1-15 were rejected under 35 USC §101 as being directed to non-statutory subject matter. Regarding this rejection, the Office Action indicates that the claims consist solely of data manipulation and do not produce a concrete, useful, or tangible result.

By the present Amendment, Applicants have amended independent claims 1 and 6, in part, to address this particular issue. Specifically, independent claims 1 and 6 now recite an additional step of displaying the topographic maps that are produced during the process. Regarding independent claim 15, Applicants respectfully submit that this claim defines an apparatus, and therefore believed to be statutory in its current form. Applicants further note that independent claim 15 includes display means for displaying digital data, that has been stored in the recording means, in the form of a single or multilayer map structure.

Applicants therefore respectfully submit that the presently pending claims now define statutory subject matter as required by 35 USC §101.

VI. Rejections under 35 USC §112

Claim 9 was rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement. Regarding this rejection, the Office Action indicates that claim 9 recites "a fourth topographic map" which is not supported in the original Specification.

As discussed during the interview, however, the fourth topographic map is not a map that is produced by the claimed methodology. Rather, the fourth topographic map corresponds to a map selected by the user for display in conjunction with the third topographic map generated by the claimed methodology.

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated October 18, 2006

It is therefore respectfully submitted that independent claim 9 is in full compliance with the written description requirements of 35 USC §112, first paragraph.

Claims 5, 9, and 15 were rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter regarded as the invention. Regarding this rejection, the Office Action cites various instances of language that was considered indefinite and/or otherwise lacking in proper antecedent basis.

By the present Amendment, Applicants have amended claims 5, 9, and 15 to address all the issues of indefiniteness raised in the Office Action. Applicants specifically note that the amendments made to these claims correspond to the proposed amendments agreed upon during the interview.

It is therefore respectfully submitted that, as amended, the presently pending claims satisfy the requirements of 35 USC §112, second paragraph.

VII. Rejections under 35 USC §103

Claims 1-3, 6, and 15 were rejected under 35 USC §103(a) as being unpatentable over the Background of the Invention in view Yura and further in view of Christensen. Regarding this rejection, the Office Action indicates that the Background of the Invention discloses various information regarding UTM drawing methods for producing topographic maps. Further, the Office Action indicates that the Background of the Invention discloses the concept of dividing the earth by an angle of six degrees between longitude lines that neighbor each other. The Office Action admits that the Background of the Invention does not expressly disclose connecting sectors with the same elevation or a smoothing process. Yura is relied

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated October 18, 2006

upon for disclosing a basic map of the earth that is produced through UTM where the map is divided into grid-like sectors that are subsequently into smaller segments. The Office Action also indicates that Yura discloses connection of points with the same altitude. The Office Action admits that Yura fails to expressly disclose a smoothing process of any obtained data points. Christensen is relied upon for disclosing a process for smoothing data by forming a triangle into curved contour lines.

Independent claim 1 has been amended to define a method for producing a digital topographic map that comprises the steps of:

dividing a basic map, produced through a UTM drawing method, into irregular grid-like sectors at a predetermined distance;

further dividing each irregular grid-like sector obtained to thereby produce irregular small sectors;

interpolating discontinuous data between each irregular grid-like sector and between each of the irregular small sectors;

producing digital data by using an algorithm to relate x,y coordinates of the irregular small sectors to elevation levels obtained from the UTM drawing method;

connecting the irregular small sectors at a common elevation with a straight line, thereby producing a first topographic map, on which contour lines are formed with line segments;

conducting a smoothing process on the contour lines of said first topographic map to produce a second topographic map, on which the contour lines are formed with curved lines that are smoother than the contour lines of said first topographic map;

revising and interpolating each irregular quadrilateral, produced from the basic map and the map elements through said UTM drawing method, to form a right-angled quadrilateral, thereby producing a third topographic map; and

displaying the third topographic map.

According to the method of independent claim 1, the basic UTM map is divided into irregular grid-like sectors and further subdivided into irregular small

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated October 18, 2006

sectors. An interpolation is performed on discontinuous data points between each irregular grid-like sector and each irregular small sector. Digital data is produced to relate the XY coordinates of the small irregular sectors to elevation levels obtained from the UTM drawing method. Irregular small sectors at a common elevation are connected with straight lines to produce a first topographic map wherein the contour lines are formed with line segments. A smoothing process is performed on the contour lines to produce a second topographic map wherein the contour lines are formed with curve lines that are smoother than the contour lines of the first topographic map. Next, irregular quadrilaterals, produced from the basic map and the map elements through the UTM drawing method, are revised and interpolated to form right-angled quadrilaterals, thereby producing a third topographic map. The third topographic map is subsequently displayed on any appropriate output device. According to the method of independent claim 1, the smoothing process is performed prior to changing the irregular quadrilaterals into right-angled quadrilaterals. Since the smoothing process is conducted on the contour lines of the first topographic map, the elevation level is obtained as data from the UTM drawing method. It becomes subsequently easier and more efficient to convert the irregular quadrilaterals into right-angled quadrilaterals in order to produce the third topographic map.

Yura discloses a computer system and method for processing various maps. The system is capable of selecting between various kinds of drawing methods for the maps based on a request to display the particular map. Once the request is received, the system determines the most suitable method for displaying the map. Yura does not provide any disclosure or suggestion for conducting the smoothing process prior to converting the irregular quadrilaterals to right-angled quadrilaterals.

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated October 18, 2006

Christensen discloses a method for smoothing raw isolines containing linear segments within a triangular mesh. Christensen provides no disclosure or suggestion for resolving problems associated with the discontinuity between neighboring sectors. Additionally, Christensen fails to provide any disclosure or suggestion for conducting the smoothing process prior to converting the irregular quadrilaterals to right-angled quadrilaterals.

The art of record simply fails to provide any disclosure or suggestion for generating the third topographic map as set forth in independent claim 1. Specifically, the art of record fails to provide any disclosure or suggestion for features recited in independent claim 1 such as:

- conducting a smoothing process on the contour lines of said first topographic map to produce a second topographic map, on which the contour lines are formed with curved lines that are smoother than the contour lines of said first topographic map;

- revising and interpolating each irregular quadrilateral, produced from the basic map and the map elements through said UTM drawing method, to form a right-angled quadrilateral, thereby producing a third topographic map; and

- displaying the third topographic map.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 2, 3, and 5 depend from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 1. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated October 18, 2006

Independent claim 6 defines a method for producing a digital topographic map that comprises, in part, the steps of:

conducting a smoothing process on the contour lines of said first topographic map to produce a second topographic map, on which the contour lines are formed with curved lines that are smoother than the contour lines of said first topographic map;

revising and interpolating each irregular quadrilateral, produced from the basic map and the map elements through said UTM drawing method, to form a right-angled quadrilateral, thereby producing a third topographic map from said second topographic map;

storing digital data for producing said third topographic map in a recording means, together with map element data;

displaying the third topographic map together with the map element data on a display means as a single or multi-layer structure, or outputting the third topographic map together with the map element data on a paper.

Similar to independent claim 1, independent claim 6 includes a step of conducting the smoothing process on the contour lines. The step is also performed prior to converting the irregular quadrilaterals to right-angled quadrilaterals. As previously discussed with respect to independent claim 1, these features are not shown or suggested by the art of record.

It is therefore respectfully submitted that independent claim 6 is allowable over the art of record.

Claims 7-14 depend from independent claim 6, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 6. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated October 18, 2006

Independent claim 15 defines an apparatus for producing a digital topographic map that comprises:

a means for dividing a basic map, produced through a UTM drawing method, into irregular grid-like sectors at a predetermined distance, and further dividing each irregular grid-like sector obtained into irregular small sectors while interpolating discontinuous data between each irregular grid-like sector and each of the irregular small sectors, and reading elevation levels from digital data of the digital topographic map, so as to be aligned on a plane, thereby producing mesh-like data, and further storing the data as vector data therein;

a means for producing a first topographic map by reading out the vector data for each of the irregular small sectors stored in said storing means, so as to connect each irregular small sector with a straight line while selecting a measurement point in a vicinity thereof when the elevation is the same judging from data defining tolerance on the elevation level, without intersection on those line segments with each other;

a means for producing a second topographic map, by conducting a smoothing process upon curved lines, passing through a contact point of the line segments of said first topographic map, and having continuous differential coefficients, thereby producing the second topographic map, on which the contour lines are made up with a group of curved lines;

a means for producing a third topographic map from said second topographic map, by revising and interpolating an irregular quadrilateral, which is produced upon basis of said basic map produced through the UTM drawing method, and also map elements, into a right-angled quadrilateral;

a recording means for storing therein said digital data for producing said third topographic map, together with map element data; and

a display means for displaying the digital data stored within said recording means into a single or multi-layer structure.

The apparatus of independent claim 15 defines the necessary hardware for performing various processes that are somewhat similar to those defined by independent claims 1 and 6. For example, the apparatus of independent claim 15 produces a second topographic map by conducting a smoothing process on the curved lines. Further, a third topographic map is produced from the second

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated October 18, 2006

topographic map by revising and interpolating each irregular quadrilateral to form right-angled quadrilaterals. As previously discussed with respect to independent claim 1, the art of record simply fails to provide any disclosure or suggestion for such features. It is therefore respectfully submitted that independent claim 15 is allowable over the art of record.

VIII. Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.


If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated October 18, 2006

AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 253.44337X00).

Respectfully submitted,
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Attachment: Replacement Sheet (1)